

### **Remarks/Arguments**

Claims 8, 9, 14-20 are currently pending in the application for the Examiner's review and consideration. Claims 8, 14, 16, 18-20 have been amended herein to replace the phrase "across the entire width of the flange" with "across the entire length of the flange perpendicular to the axial direction of the steel column" in order to clarify that the open space is oriented perpendicular to the axis of the steel column. Support for the amendment is found in the specification as filed at, e.g., amended paragraph beginning on p. 23, l. 34; p. 24, ll. 8-13; p. 26, ll. 13-21; and Figures 12(a) and 16. The claims have also been amended to make the language clearer. Applicants respectfully submit that no new matter has been added.

### **Claim rejection under 35 U.S.C. §103**

Claims 8, 16, 18, and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 05-263469 to Furuumi ("JP '469") in view of U.S. Patent No. 6,059,482 to Beauvoir ("US '482") for the reasons stated in the office action dated February 4, 2009.

As discussed in the previous response (*see* amendment dated June 3, 2009), the present invention provides a column and beam join structure capable of minimizing damages to the structure by plasticizing the split tee in advance of the column and beam so as to absorb energy of external force when the external force such as an earthquake or strong winds acts on the structure and thereby avoiding the external force to act on the column and beam. In the column-beam join structure of the present invention, in order to plasticize the split tee in advance of the column and beam, an open space is provided between the column and the flange of the split tee across the entire length of the flange perpendicular to the axial direction of the steel column by inserting a space keeping member between the column and flange of the split tee or by partially reducing the thickness of the flange of the split tee. A portion of the flange of the split tee facing the open space can plasticize in advance of the column and beam and absorb energy of external force when the external force such as an earthquake or strong winds acts on the structure. Therefore, deformation of the column and beam of the structure can be minimized and the structure is kept safe. Applicants have amended claims 8, 16, 18 and 20 to clarify that the open space, which is provided across the entire length of the flange, is perpendicular to the axis of the column to which the split tee is connected.

On the contrary, JP '469 discloses an open space between the column and the flange in a direction parallel to the axis of the steel column (*see, e.g.,* the space between spacers 2 in

Figure 1 of JP '469). Please also see the figures in Attachment A submitted with the Response filed June 3, 2009. This difference affects the plasticization of the split tee and the absorption ability of energy from an external force. Such a force acts on the beam and is transferred from the web of the split tee to the column via a flange. In the present invention, since the open space between the flange of the split tee and the column is provided in the direction perpendicular to the axis of the steel column and at the region corresponding to the web of the split tee, when the force is acted on the web of the split tee, the flange corresponding to the portion where the open space is provided easily plasticizes and absorbs the energy of the force. In JP '469, since the open space between the flange of the split tee and the column exists in the direction parallel to the axis of the steel column and there is little space at the region corresponding to the web for the flange to deform. When the force acts on the beam, the flange is tensioned as a whole and partial deformation of the flange does not occur and the split tee cannot be plasticized. The energy of the force cannot be absorbed. Therefore, JP '469 does not disclose or suggest the column-and-beam join structure of the present invention.

US '482 also does not disclose an open space provided between the column and the flange of the split tee across the entire length of flange perpendicular to the axis of the steel column of the split tee. As discussed in the previous response (*see* the Response filed June 3, 2009), the flange of US '482 is merely tapered and does not have a cross-sectional shape of the present invention promoting plasticization (*see*, e.g., US '482 Fig. 7). Therefore, US '482 does not supply what are missing in JP '469.

Claims 14 and 19 remain rejected under 35 U.S.C. §103(a) as being unpatentable over JP '469 in view of U.S. Patent No. 4,905,436 to Matsuo et al. ("US '436") and US '482 for the reasons stated in the office action dated February 4, 2009. Claims 14 and 19 have been amended to clarify that the open space is provided between the column and the flange of the split tee across the entire length of the flange perpendicular to the axial direction of the steel column.

As discussed above, both JP '469 and US '482 do not suggest or teach the present invention. US '436 does not provide an open space between the flange of the column and the flange of the connector (*see*, e.g., US '436 Figs. 9-10), which would serve as a deforming space for the flange of the split tee, as in the present invention, in the region corresponding to the extended direction of the web of the split tee of the present invention. Thus, US '436 does not supply what are missing in JP '469 and US '482.

Claims 9 and 17 remain rejected under 35 U.S.C. §103(a) as being unpatentable over JP '469 in view of US '482 and further in view of U.S. Patent No. 6,754,992 to Byfield et al. ("US '992") for the reasons stated in the office action dated February 4, 2009.

As discussed in the previous response, in the present invention, the web of the split tee is connected to the flange of the beam by bolting, while in US '992, as shown in Figs. 1, 2, 8-10, 12-13, 25, 27 and 28, the web of the connector (split tee) is connected to the web of the beam by engaging with studs and not by bolting. Therefore, the joining form of the present invention is completely different than US '992.

US '992 does not disclose or suggest including an open space oriented perpendicular to the axis of the column between the flange of the split tee and the column to provide for the flange of the split tee to plasticize prior to the column and beam. Although US '992 discloses flanges having a partially reduced region as depicted in Figs. 19 and 20, such flanges, when attached to column 1 as shown in Fig. 1 of US '992, would have led to an open space oriented parallel to the axial direction of the column. Therefore, US '992 does not supply what are missing in JP '469 and US '482.

Claim 15 remain rejected under 35 U.S.C. §103(a) as being unpatentable over JP '469 in view of US '482 and US '436 and further in view of US '992 for the reasons stated in the office action dated February 4, 2009.

As discussed above, none of the cited references disclose or suggest the present invention. Therefore, one skilled in the art would not have combined the disclosure of JP '469 with the disclosures US '436, US '482 and US '992 to arrive at the column and beam join structure of the present invention.


For at least these reasons, the rejections of claims 8, 9, and 14-20 under 35 U.S.C. § 103(a) over JP '469 in view of US '436, US '482 and US '992 cannot stand, and should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the present application is in condition for allowance. Early and favorable action by the Examiner is earnestly solicited. If the Examiner believes that issues may be resolved by a telephone interview, the Examiner is invited to telephone the undersigned at the number below.

Respectfully Submitted,

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